IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A laser processing apparatus, comprising:

a laser source;

a spatial phase modulator configured to modulate a phase of a laser beam emitted from the laser source;

a synthetic data generator configured to generate synthetic data by combining hologram image data representing a pattern image to be processed with position displacement hologram data for shifting the pattern image to a prescribed position, said synthetic data being input to the spatial phase modulator for the phase modulation of the laser beams; and

a focusing optical unit configured to guide the phase-modulated laser beam onto a surface to be processed to reproduce the pattern image on the processed surface,

wherein said position displacement hologram data includes either a horizontal hologram data set representing displacement in a direction parallel to the processed surface, a vertical hologram data set representing displacement in a direction perpendicular to the processed surface, or a combination of the horizontal and vertical hologram data sets, and

wherein the horizontal data set and the vertical data set are distinct from each other and calculated separately.

Claim 2 (Canceled).

Claim 3 (Previously Presented): The laser processing apparatus of claim 1, wherein the horizontal hologram data set has substantially a sawtooth phase distribution profile.

Claim 4 (Previously Presented): The laser processing apparatus of claim 1, wherein the vertical hologram data set has a phase distribution profile similar to a Fresnel zone plate.

Claim 5 (Original): The laser processing apparatus of claim 4, wherein a distance from the spatial phase modulator to the focusing optical unit is equal to a focal length of the focusing optical unit.

Claim 6 (Previously Presented): The laser processing apparatus of claim 1, further comprising:

a wavefront measuring unit configured to measure a wavefront of the laser beam input to the spatial phase generator,

wherein the synthetic data generator generates correction data for correcting distortion of the wavefront of the laser beam detected by the wavefront measuring unit, and the correction data are supplied to the spatial phase modulator.

Claim 7 (Original): The laser processing apparatus of claim 1, further comprising at least one of:

an irradiation time adjusting unit configured to regulate irradiation time of the laser beam; and

a beam intensity adjusting unit configured to regulate an intensity of the laser beam.

Claim 8 (Previously Presented): The laser processing apparatus of claim 1, further comprising:

a horizontal-direction position detector configured to detect a horizontal position in a plane parallel to the processed surface,

wherein the synthetic data generator generates the horizontal hologram data set based on the detection result.

Claim 9 (Original): The laser processing apparatus of claim 8, wherein the horizontal-direction position detector detects a reference pattern formed on the processed surface.

Claim 10 (Original): The laser processing apparatus of claim 1, further comprising:

a first driving unit configured to move a light spot of the laser beam relative to the processed surface in a direction parallel to the processed surface.

Claim 11 (Previously Presented): The laser processing apparatus of claim 1, further comprising:

a vertical-direction position detector configured to detect a positional relation between the focusing optical unit and the processed surface in a direction perpendicular to the processed surface,

wherein the synthetic data generator generates the vertical hologram data set based on the detection result.

Claim 12 (Original): The laser processing apparatus of claim 1, further comprising:

a second driving unit configured to move a position of the processed surface relative to the focusing optical unit in a direction perpendicular to the processed surface.

Claim 13 (Original): The laser processing apparatus of claim 1, wherein the laser source is an ultra-short pulse laser source with a pulse width at or below several picoseconds.

Claim 14 (Currently Amended): A laser processing method, comprising:

calculating hologram image data representing a pattern image to be processed on a object;

generating position displacement data for shifting the pattern image to a prescribed position with respect to a processed surface of the object;

combining the hologram image data with the position displacement data to produce synthetic hologram data;

modulating a phase of a laser beam using the synthetic hologram data; and

guiding the phase-modulated laser beam onto the processed surface using an optical system,

wherein said position displacement data includes either a horizontal hologram data set representing displacement in a direction parallel to the processed surface, a vertical hologram data set representing displacement in a direction perpendicular to the processed surface, or a combination of the horizontal and vertical hologram data sets, and

wherein the horizontal data set and the vertical data set are distinct from each other and calculated separately.

Claim 15 (Previously Presented): The laser processing method of claim 14, further comprising:

setting a distance between a phase modulating position and the optical system equal to a focal length of the optical system.

Claim 16 (Currently Amended): A computer readable storage medium encoded with a computer readable program configured to cause an information processing apparatus to execute a method, the method comprising:

calculating hologram image representing a pattern image to be processed on an object;

generating position displacement data for shifting the pattern image to a prescribed position with respect to a processed surface of the object;

combining the hologram image data with the position displacement data to produce synthetic hologram data; and

inputting the synthetic hologram data to a phase modulator to control phase modulation performed on a laser beam,

wherein said position displacement data includes either a horizontal hologram data set representing displacement in a direction parallel to the processed surface, a vertical hologram data set representing displacement in a direction perpendicular to the processed surface, or a combination of the horizontal and vertical hologram data sets, and

wherein the horizontal data set and the vertical data set are distinct from each other and calculated separately.

Claim 17 (Canceled).

Claim 18 (Currently Amended): The computer readable storage medium of claim [[17]] 16, wherein the generating includes generating the horizontal hologram data set having has substantially a sawtooth phase distribution profile.

Claim 19 (Currently Amended): The computer readable storage medium of claim

[[17]] 16, wherein ~~generating includes generating~~ the vertical hologram data set ~~having~~ has a

phase distribution similar to a Fresnel zone plate.

Claim 20 (New): The laser processing apparatus of claim 1, wherein the combination

of the horizontal hologram data set and the vertical hologram data set includes adding the

horizontal hologram data set and the vertical hologram data set together.